

PATENT COOPERATION TREATY

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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C. 20231
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year)

12 October 2000 (12.10.00)

International application No.

PCT/EP00/02177

Applicant's or agent's file reference

6540/WO

International filing date (day/month/year)

08 March 2000 (08.03.00)

Priority date (day/month/year)

10 March 1999 (10.03.99)

Applicant

DIXON, Dan et al

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

11 September 2000 (11.09.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

S. Mafla

Telephone No.: (41-22) 338.83.38

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 6540/W0	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/EP 00/ 02177	International filing date (day/month/year) 08/03/2000	(Earliest) Priority Date (day/month/year) 10/03/1999
Applicant SOCIETE DES PRODUITS NESTLE S.A.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. _____

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/02177

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A23K1/10 A23K1/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 A23K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, FSTA, CAB Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 869 121 A (DIXON DAN ET AL) 9 February 1999 (1999-02-09) column 1, line 38 -column 4, line 53 column 1 claims 1,14-16 ----	1-8,10, 12-14, 18-22, 24-27
Y	WO 97 02760 A (NESTLE SA) 30 January 1997 (1997-01-30) examples 1-7 claims 1,6,10 ----	1-8,10, 12-14, 18-22, 24-27
A	GB 2 237 497 A (SUPREME PETFOODS LIMITED) 8 May 1991 (1991-05-08) the whole document ----- -/--	1

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier document but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

11 July 2000

Date of mailing of the international search report

21/07/2000

Name and mailing address of the ISA
 European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Dekeirel, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/02177

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 37 01 861 A (MUELLER EDMUND) 4 August 1988 (1988-08-04) the whole document ---	1
A	PATENT ABSTRACTS OF JAPAN vol. 008, no. 093 (C-220), 27 April 1984 (1984-04-27) -& JP 59 011147 A (NIHON NOUSAN KOGYO KK), 20 January 1984 (1984-01-20) abstract ---	1
A	PATENT ABSTRACTS OF JAPAN vol. 014, no. 096 (C-0692), 22 February 1990 (1990-02-22) -& JP 01 304864 A (GURUMETSUKU KENKYUSHO:KK), 8 December 1989 (1989-12-08) abstract -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/02177

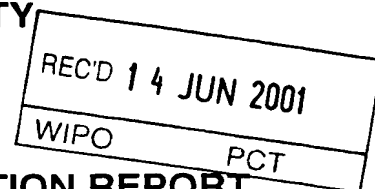
Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5869121 A	09-02-1999	AU 2621999 A WO 9938388 A	16-08-1999 05-08-1999
WO 9702760 A	30-01-1997	AU 701156 B AU 6656196 A CA 2222714 A EP 0837637 A JP 2000500003 T	21-01-1999 10-02-1997 30-01-1997 29-04-1998 11-01-2000
GB 2237497 A	08-05-1991	NONE	
DE 3701861 A	04-08-1988	NONE	
JP 59011147 A	20-01-1984	NONE	
JP 01304864 A	08-12-1989	NONE	

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference NO 6540/WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/02177	International filing date (day/month/year) 08/03/2000	Priority date (day/month/year) 10/03/1999
International Patent Classification (IPC) or national classification and IPC A23K1/10		
Applicant SOCIETE DES PRODUITS NESTLE S.A.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 6 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 11/09/2000	Date of completion of this report 12.06.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Meyer, J-P Telephone No. +49 89 2399 8649



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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference NO 6540/WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/02177	International filing date (day/month/year) 08/03/2000	Priority date (day/month/year) 10/03/1999
International Patent Classification (IPC) or national classification and IPC A23K1/10		
Applicant SOCIETE DES PRODUITS NESTLE S.A.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 11/09/2000	Date of completion of this report 12.06.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Meyer, J-P Telephone No. +49 89 2399 8649 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/02177

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-9 as originally filed

Claims, No.:

1-27 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/02177

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-27
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-27
Industrial applicability (IA)	Yes:	Claims	1-27
	No:	Claims	

2. Citations and explanations see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/02177

Re Item V

- 1) Reference is made to the following documents:

D1: US 5 869 121

D2: WO 97 02760.

- 2) D1 discloses a moisture-reduced pet treat that is of improved palatability having a texture and appearance similar to that of cooked meat and comprising a fried body fo a thermally gelled matrix containing protein and starch. The moisture content is of less that 20 %.
- 3) D2 refers to a formulated emulsion product having a meat-like texture and appearance and an excellent palatability, containing a protein source and a water content of from 45 %. Additional ingredients such as fats, sugar and the like may be added.
- 4) The subject-matter of independent claims 1, 12, 18 and 24 is considered as being novel, because it is not disclosed in its entirety in any one of the documents cited in the search report.
- 5) D1 represents the closest prior art, because the known product differs from that claimed in claim 1 of the present application only by having a moisture content of less that 20 % instead of more that 25 %, both having the same properties (see p. 1, 28-31 of the description of the present application).

However, a product having a meat-like texture and appearance and an excellent palatability and a moisture content is of more than 25 % is already known from D2. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply this feature with corresponding effect to a pet treat according to document D1, thereby arriving at a pet treat according to claim 1 of the present application. The subject-matter of claim 1 does therefore not involve an inventive step (Article 33(3) PCT).

- 5.1) The same conclusion applies to claim 12.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/02177

- 6) D1 represents also the closest prior art in respect of claims 18 and 24 of the present application. As the moisture content of the pieces is not mentioned, their subject-matter differs from the disclosures of D1 only by retorting the container.

However, the skilled person would regard this feature as merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed. Thus, the subject-matter of claims 18 and 24 does not involve an inventive step and does not satisfy the criterion set forth in Article 33(3) PCT.

- 7) Having regard to the general disclosures of the cited prior art, dependent claims do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step.

Re Item VII

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D2 is not mentioned in the description, nor are these documents identified therein.

Re Item VIII

- 1) The statements in the description "the disclosures of which are incorporated by reference" implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them (see also the PCT Guidelines, III-4.3a).
- 2) The same conclusion applies to the last paragraph of p. 9.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/02177

- 3) It appears that the moisture content of at least 25 % represents an essential feature of the invention.
Since independent claims 18 and 24 do not contain this feature they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.
- 4) The term "produced" used in claim 24 has not been replaced by "obtainable".

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : A23K 1/10, 1/18	A1	(11) International Publication Number: WO 00/53031
		(43) International Publication Date: 14 September 2000 (14.09.00)
<p>(21) International Application Number: PCT/EP00/02177</p> <p>(22) International Filing Date: 8 March 2000 (08.03.00)</p> <p>(30) Priority Data: 60/123,692 10 March 1999 (10.03.99) US</p> <p>(71) Applicant (for all designated States except US): SOCIETE DES PRODUITS NESTLE S.A. [CH/CH]; P.O. Box 353, CH-1800 Vevey (CH).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): DIXON, Dan [US/US]; 12527 Country Road 443, St. Joseph, MO 64505 (US). RAYNER, Michael, G. [US/US]; 4904 Creek Crossing Drive, St. Joseph, MO 64507 (US). SAYLOCK, Michael, J. [US/US]; 3621 NW 75th Court, Kansas City, MO 64151 (US).</p> <p>(74) Agent: VUILLE, Roman; 55, avenue Nestlé, CH-1800 Vevey (CH).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>
(54) Title: FRIED PET TREATS		
<p>(57) Abstract</p> <p>A pet treat in a sealed container. The treat is in the form of one or more pieces of a formulated food product. Each piece has a fried body of a thermally gelled matrix containing protein and starch. Further, each piece has a moisture content of above about 25 % by weight. The pet treat may be retorted. If not retorted, it may include a preservative and preferably have a reduced pH. The non-retorted treat pieces are provided in a sealed container comprising a pouch.</p>		

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Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
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Fried pet treats**Field of the Invention**

5 This invention relates to a pet treat, preferably retorted, which simulates the appearance of meat. The invention also relates to a process of producing the pet treat.

Background of the Invention

10

Pet treats differ from normal pet foods in that they are not intended to supply the pet's main ration. Instead, they generally intended as a means of rewarding a pet; particularly as part of a process to modify behavior. Therefore, while pet treats may contain essential nutrients, they are usually not nutritionally balanced. They are, however, highly palatable to pets, in particular to cats and dogs.

15

Pet treats are available in different forms. The first category is dried pet treat which contain less than about 15% by weight moisture. Examples are baked products, such as bone shaped products for dogs. A second category is semi-moist or intermediate moisture pet treat which have moisture contents of about 20% to 50% by weight. These products are generally characterized by a soft, crumbly texture and densities comparable to meat or leathery products. These products are rendered stable by the inclusion of various acids and solutes which alter the pH and water activity to a level which prevents mold and bacterial growth. The third category covers pet chews or jerkies. These products are chewy, have low to intermediate moisture contents, are relatively dense and are shelf stable. These products are primarily intended to be chewed by the pets.

20

25

However, there is a need for additional forms of pet treats which are highly palatable. It is thus an object of the invention to provide a pet treat that is of excellent palatability and that has texture and appearance similar to that of cooked meat while being of relatively low moisture content.

30

Summary of the invention

35

In one aspect, this invention provides a pet treat comprising a sealed container; and

one or more pieces of a formulated food product in the container, each piece comprising a fried body of a thermally gelled matrix containing protein and starch and having a moisture content of at least about 25% by weight.

5 In a preferred form of the invention, the moisture content exceeds about 30% by weight.

The pieces of the formulated food product have a texture and appearance similar to that of cooked meat. Further, the pieces have excellent palatability making them suitable for use as treats.

10 Preferably the pet treat is retorted and the sealed container is retortable.

Preferably the thermally gelled matrix is in the form of a layered, gelled matrix. The pieces preferably have a moisture content of about 30% to about 50% by weight.

15 The pet treat may further include a preservative.

The invention extends to a retorted pet treat comprising a retortable, sealed container; and one or more pieces of a formulated food product in the container, each piece comprising a fried body of a thermally gelled matrix containing protein and starch and having a moisture content of above about 30% by weight.

20 In a preferred form of the invention, the retorted pet treat has a moisture content of about 35% to 50% by weight.

The fried body of each piece may comprise layers of a thermally gelled matrix containing the protein and the starch.

25 In another aspect, this invention provides a process for producing a fried pet treat product, the process comprising:

thermally gelling a protein source and a starch source for providing a thermally gelled matrix;
forming the thermally gelled matrix into pieces;
30 frying the pieces for providing fried pieces and reducing the moisture content of the pieces to no less than 25% moisture by weight;
providing a container to receive the pieces;
filling the pieces into the container; and
sealing the container.

35

Preferably the process further comprises forming the thermally gelled matrix into a layered, gelled matrix prior to forming the matrix into pieces. This may be accomplished by using mechanical energy to heat the protein source and the starch source.

5 In a preferred form of the invention, the process includes introducing a preservative into the container.

The process may include the further step of reducing the pH of the pieces to the range from 4.5 to 5.2.

Preferably the frying is flash frying.

10 In a further preferred form of the invention, the container is a sealable pouch.

In a further aspect, this invention provides a process for producing a retorted pet treat, the process comprising:

15 thermally gelling a protein source and a starch source for providing a thermally gelled matrix;
forming the thermally gelled matrix into pieces;
flash frying the pieces for providing fried pieces;
providing a retortable container,
20 filling the pieces into the container; and
retorting the container.

Preferably the process further comprises forming the thermally gelled matrix into a layered, gelled matrix prior to forming the matrix into pieces. This may be accomplished by heating the protein source and the starch source using mechanical energy in an emulsion mill and ejecting the heated mixture from the emulsion mill into a holding tube.

25 The pieces preferably have a moisture content of about 50% to about 65% by weight prior to frying. After frying, the fried pieces preferably have a moisture content of about 25% to about 50% by weight.

The process may further comprise filling moisture into the retortable container with the fried pieces, sufficient moisture being provided to raise the moisture content of the fried pieces to that of the pieces prior to frying, or to any other desired level.

35 The process may include introducing a preservative into the container.

Detailed Description of Preferred Embodiments of the Invention

Embodiments of the invention are now described, by way of example only.

5 The invention is a pet treat in the form of pieces of a formulated food product in a sealed container. Each piece comprises a fried body of a thermally gelled matrix containing protein and starch and having a moisture content of above about 25% by weight. Treats in this form are particularly suited to cats and dogs, depending respectively on the final product make-up, as set out more
10 fully below.

 Where the pieces are sealed in a retortable container, for retorting in due course, their moisture content may be above about 30% by weight, preferably from about 35% to about 50% by weight and more preferably about 40%. For non-retorted products, it is desirable to keep the moisture content relatively low,
15 for example preferably from about 25% to 35% by weight.

 The protein source and starch source used in the thermally gelled matrix may be any suitable protein and starch source. The choice of the starch and protein sources will be largely determined by nutritional needs, palatability considerations, and the type of food produced.

20 The protein source may be a vegetable protein source, an animal protein source, or a mixture of these protein sources. Suitable vegetable protein sources are wheat protein, soy protein, rice protein, corn protein, and the like. These proteins may be provided in the form of flours, concentrates and isolates as desired. Suitable animal protein sources are muscular or skeletal meat of
25 mammals, poultry, and fish; meals such as meat meal, bone meal, fish meal, and poultry meal; by-products such as hearts, liver, kidneys, tongue and the like; and milk proteins.

 The starch source is conveniently a grain such as corn, rice, wheat, barley, oats, or soy, and mixtures of these grains. The grain is conveniently provided in
30 the form of a flour. Pure or substantially pure starches may also be used if desired. If flours are used, they will also provide some protein. Hence it is possible to use a material which is both a protein source and a starch source.

 Various other ingredients, for example, salt, spices, seasonings, vitamins, minerals, flavoring agents, lipids, humectants, sugar and the like may also be
35 incorporated into the thermally gellable mixture as desired. If added, the lipids may be any suitable animal fats; for example tallow, or may be vegetable fats.

The pet treat is produced by forming a thermally gelled matrix, forming the matrix into pieces, frying the pieces and filling the pieces into a container. The container is preferably retortable and is retorted. If the container is not retorted, suitable preservatives and agents to modify water activity to prevent or reduce microbial growth should be added. They may optionally be added to the retortable mixture to increase shelf life after opening of the end product by the end user.

The thermally gelled matrix may be produced in many different ways as desired.

For example, a thermally gellable mixture may be prepared from water and all the ingredients which make up the moisture-reduced, formulated food product. The thermally gellable mixture is then heated and formed into layers. This may be done as described in US patents 4,781,939 and 5,132,137; the disclosures of which are incorporated by reference. As described in these patents, the thermally gellable mixture is fed to an emulsion mill in which the mixture is subjected to rapid mechanical heating and shearing. Any suitable emulsion mill may be used, for example the emulsion mill disclosed in US patent 5,132,137. Other suitable emulsion mills are commercially available under the trade name of Trigonal and may be obtained from Siefer Maschinenfabrik GmbH & Co KG, Bahnhofstrasse 114, Postfach 101008, Velbert 1, Germany.

In the emulsion mill, the temperature of the mixture is raised to the desired gelling temperature within a very short time; usually less than one or two seconds. Preferably the temperature is raised to about 100°C to about 120°C. Alternatively, the temperature may be raised to in the range of about 45°C to about 75°C as described in US patent 5,132,137. Usually the mechanical energy generated in the emulsion mill will be sufficient to heat the mixture to the desired temperature but this may be supplemented by the injection of superheated steam.

The heated mixture is ejected from the emulsion mill in a thin stream into a holding tube. Because the heat mixture enters the holding tube in a thin stream, it forms thin layers upon heated mixture already in the holding tube. The layered, heated mixture in the holding tube then gels while moving slowly along the holding tube. Each layer of the layered, heated mixture remains substantially, visually distinct. The residence time of the heated mixture in the holding tube is sufficient for the mixture to gel into a firm, gelled product upon reaching the exit of the holding tube. At this stage, the gelled product has the highly striated appearance and the texture of meat.

In another example, the thermally gelled matrix may be produced by emulsifying water and the ingredients which make up the moisture-reduced, formulated food product. A high speed emulsifier or homogenizer is particularly suitable for emulsification. If necessary or desired, a gelling agent may be added.

5 The emulsion is then heated to thermally gel the emulsion to provide a thermally gelled matrix; for example in a mixer-cooker or extruder. The thermally gelled matrix may then be forced through an orifice such as an extrusion die to provide a gelled product suitable for cutting into pieces.

10 The gelled product obtained from the process used is then cut into pieces in a suitable cutter. The pieces are preferably of a size suitable for use in as a pet treat; for example, for dogs, of length of about 20 mm to about 35 mm. For cats, the length may be about 8 mm to about 20 mm. The pieces may be screened to remove fines.

15 The pieces are then flash fried. This is conveniently carried out in a deep fat frying apparatus. Any suitable deep fat frying apparatus may be used. The fat used to fry the pieces may be any suitable animal or vegetable fat or oil. Suitable vegetable oils are peanut oil, corn oil, cottonseed oil, sunflower oil, hydrogenated soybean oil and the like. Beef tallow is a suitable animal oil. The temperature of the oil is preferably in the range of about 110°C to about 205°C; 20 for example about 160°C to about 180°C.

The pieces are fried for a time sufficient to reduce their moisture content - but not to less than about 25% by weight - and to provide them with a desired color and texture. For example, the moisture content may be reduced to about 40% by weight for a retortable product. For a non-retorted, pouched product, the 25 moisture content is preferably reduced to between 25% and 35%. Depending upon the temperature of the oil, the frying time may vary between about 5 seconds to about 2 minutes; preferably from about 10 seconds to about 1 minute. The specific time and temperature needed for any particular product will depend upon the size of the pieces but may be rapidly determined by a skilled person.

30 The fried pieces produced from layered pieces retain the expanded, layered structure of the unfried, layered pieces. Hence the meat-like appearance is retained.

The fried pieces may then be drained and cooled; for example to about 15°C to about 35°C.

35 The fried pieces may then be filled into suitable containers using suitable filling apparatus. Where the containers chosen are retortable, these may be any

suitable containers such as cans, aluminum-based trays, and the like. Non-retortable containers typically would include sealable pouches of suitable plastics materials.

5 Similarly, the filling machine may be any suitable filling machine. Suitable containers and filling machines are commercially available.

10 Preferably, in the case of retortable containers, a small amount of moisture is filled into the containers along with the fried pieces. The amount of moisture added may be such as to raise the moisture content of the pieces to the moisture content prior to frying, or to any other desired level. Flavoring agents may be included with the moisture. Suitable flavoring agents include digests of animal matter, amino acids such as glycine, fats such as tallow, and the like. Preservatives may optionally also be included, for protecting the product after initial opening of the container for end use.

15 The containers are then retorted under conditions sufficient to effect commercial sterilization in the normal manner. Typically, for cans, retorting is carried out at a temperature of about 115°C to about 125°C for about 30 to 100 minutes.

20 The fried pieces thus may comprise from about 25% to about 60% by weight of moisture, but preferably from about 35% to 50%. If additional ingredients such as salts, sugars, spices, seasonings, flavoring agents, minerals, and the like are included in the fried pieces, these additional ingredients preferably make up about 0.5% to about 15% by weight of the fried pieces. Carbohydrates and protein make up the remainder.

25 In the case where the fried treats are to be placed into pouch-type containers, rather than be retorted, suitable preservatives are added to improve shelf stability and the pH of the prepared product is reduced. The preservatives may be added at any convenient stage of the process. Preferably they are introduced to the gellable mixture prior to thermal gelling. Non-limiting examples of suitable preservatives, that may beneficially be used, include potassium sorbate and sorbic acid and others that prevent yeast and mold growth. 30 Potassium sorbate or sorbic acid are typically used at a level of between 0.3% and 0.65% by weight, depending on the pH and water activity (A_w) of the product. The pH of the pouch contents is reduced to a value in the range from 4.5 to 5.2. This is preferably achieved by coating the pieces with acidulants after frying, but prior to placing them into the pouches. Non-limiting examples of 35

suitable acidulants include phosphoric acid or other suitable organic acids. These may be used at a level of 1.8% to 2.5% by weight to reach the desired pH. The examples following further illustrate exemplary, non-limiting embodiments of the invention:

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Example 1

A base mix for producing a thermally gellable mixture is prepared from wheat gluten, de-fatted soy flour, sugars, tallow, and water. The thermally gellable mixture is run through an emulsion mill (a Trigonal Mill obtained from Siefer Maschinenfabrik GmbH & Co KG). The heated mixture leaves the emulsion mill at a temperature range of from 103 to 115°C and is discharged into a holding tube. The residence time in the holding tube is less than 6 minutes, but sufficient for a gel to form. The gelled product leaving the holding tube is cut into pieces. The pieces have a thickness of about 4 mm to about 5 mm. The length is about 10 mm for cat treats and about 25 mm for dog treats. The pieces have a striated, meat-like appearance.

The pieces are sieved to remove fines. The moisture content of the pieces is about 55% by weight. The pieces are then transferred to a deep fat, batch fryer in which they are fried in beef tallow at a temperature of about 177°C for about 20 seconds. The pieces are then removed, allowed to drain in frying baskets, and cooled to ambient temperature. The fried pieces have a moisture content of about 40% by weight and retain their striated, meat-like appearance.

The fried pieces are then transferred to a filling apparatus. In the filling apparatus, the pieces are filled into cans along with a flavor mix and about 15% by weight water. The cans are sealed in the usual manner. The cans are then retorted in the usual manner.

Example 2

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A base mixture for cat and dog treats was prepared in the same manner as described in Example 1 above. However, prior to the mix being run through the emulsion mill as per the previous example, preservatives were added.

The thermally gellable mixture so formed was run through an emulsion mill (again a Trigonal Mill obtained from Siefer Maschinenfabrik GmbH & Co KG). The heated mixture was discharged from the emulsion mill at a temperature of

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110°C into a holding tube. The residence time in the holding tube was about 5 minutes. The product leaving the holding tube had gelled and was then cut into pieces of approximate dimensions as follows: thickness about 4-5mm, length about 10mm and height about 5mm. The pieces presented a striated, meat-like appearance.

The pieces were sieved to remove fines. The moisture content of the pieces was determined at about 55% by weight. The pieces were then transferred to a deep fat, batch fryer and were fried in beef tallow at a temperature of about 177°C for about 20 seconds. The pieces were removed, allowed to drain in frying baskets, and cooled to ambient temperature. The fried pieces were found to have a moisture content of about 27% by weight and retained their striated, meat-like appearance. The cooled pieces were coated with acidulants to reduce their pH to about 5. The fried pieces are then transferred to a filling apparatus. In the filling apparatus, the pieces were filled into plastic pouches along with a flavor mix and about 15% by weight water. The pouches were sealed in a conventional manner so as to retain moisture and flavour.

It will be appreciated that various changes, modifications and variations to and of the preferred embodiments described above will be apparent to those skilled in the art. These may be made without departing from the scope and spirit of the invention and without diminishing its attendant advantages. It is therefore intended that such changes, modifications and variations be covered by the appended claims.

Claims:

1. A pet treat comprising
a sealed container, and
5 one or more pieces of a formulated food product in the container, each
piece comprising a fried body of a thermally gelled matrix containing
protein and starch and having a moisture content of at least about 25% by
weight.
- 10 2. A pet treat according to claim 1 which has a moisture content of above
about 30% by weight.
3. A pet treat according to claim 1 in which the fried body of each piece
comprises layers of a thermally gelled matrix containing the protein and the
15 starch.
4. A pet treat according to any one of claims 1 to 3 including a preservative.
- 20 5. A retorted, pet treat comprising
a retortable, sealed container, and
one or more pieces of a formulated food product in the container, each
piece comprising a fried body of a thermally gelled matrix containing
protein and starch and having a moisture content of above about 30% by
weight.
- 25 6. A pet treat according to claim 5 which has a moisture content of about 35%
to about 50% by weight.
- 30 7. A pet treat according to claim 5 or claim 6 in which the fried body of each
piece comprises layers of a thermally gelled matrix containing the protein
and the starch.
- 35 8. A pet treat comprising a sealed container and one or more pieces of a
formulated food product and a preservative in the container, each piece
comprising a fried body of a thermally gelled matrix containing protein and
starch and having a moisture content of at least about 25% by weight.

9. A pet treat according to claim 8 which has a moisture content in the range from 25% to 35% by weight.
- 5 10. A pet treat according to claim 8 or claim 9 in which the fried body of each piece comprises layers of a thermally gelled matrix containing the protein and the starch.
- 10 11. A pet treat according to any one of claims 8 to 10 wherein each piece has a pH in the range from 4.5 to 5.2.
12. A process for producing a fried pet treat product, the process comprising:
thermally gelling a protein source and a starch source for providing a thermally gelled matrix;
15 forming the thermally gelled matrix into pieces;
frying the pieces for providing fried pieces and reducing the moisture content of the pieces to no less than 25% moisture by weight;
filling the pieces into a container; and
sealing the container.
- 20 13. A process according to claim 12 comprising forming the thermally gelled matrix into a layered, gelled matrix prior to forming the matrix into pieces.
- 25 14. A process according to claim 12 or claim 13 including the step of introducing a preservative into the container.
15. A process according to any one of claims 12 to 14 including reducing the pH of the pieces to the range from 4.5 to 5.2.
- 30 16. A process according to any one of claims 12 to 15 wherein the step of frying is flash frying.
17. A process according to any one of claims 12 to 16 wherein the container is a sealable pouch.
- 35 18. A process for producing a retorted pet treat, the process comprising:

thermally gelling a protein source and a starch source for providing a thermally gelled matrix;
forming the thermally gelled matrix into pieces;
flash frying the pieces for providing fried pieces; and
5 filling the pieces into a retortable container and retorting the container.

19. A process according to claim 18 further comprising forming the thermally gelled matrix into a layered, gelled matrix prior to forming the matrix into pieces.

10 20. A process according to claim 18 or claim 19 in which the thermally gelled matrix is formed into the layered, gelled matrix by heating the protein source and the starch source using mechanical energy in an emulsion mill and ejecting the heated mixture from the emulsion mill into a holding tube.

15 21. A process according to any one of claims 18 to 20 in which the pieces have a moisture content of about 50% to about 65% by weight prior to frying.

20 22. A process according to any one of claims 18 to 21 in which the fried pieces have a moisture content of about 35% to about 50% by weight.

25 23. A process according to any one of claims 18 to 22 further comprising filling moisture into the retortable container with the fried pieces, sufficient moisture being provided to raise the moisture content of the fried pieces to that of the pieces prior to frying.

30 24. A retorted, pet treat comprising a retortable, sealed container and one or more pieces of a formulated food product in the container, each piece comprising a fried body of a thermally gelled matrix, the pet treat being produced by a process comprising:

thermally gelling a protein source and a starch source for providing a thermally gelled matrix;

forming the thermally gelled matrix into pieces;

flash frying the pieces for providing fried pieces; and

35 filling the pieces into a retortable container and retorting the container.

25. A pet treat according to claim 24 which has a moisture content of at least about 25% by weight.
- 5 26. A pet treat according to claim 25 which has a moisture content of about 35% to about 50% by weight.
- 10 27. A pet treat according to any one of claims 24 to 26 in which the fried body of each piece comprises layers of a thermally gelled matrix containing the protein and the starch.

INTERNATIONAL SEARCH REPORT

Initial Application No

PCT/EP 00/02177

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A23K1/10 A23K1/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, FSTA, CAB Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 869 121 A (DIXON DAN ET AL) 9 February 1999 (1999-02-09) column 1, line 38 -column 4, line 53 column 1 claims 1,14-16	1-8,10, 12-14, 18-22, 24-27
Y	WO 97 02760 A (NESTLE SA) 30 January 1997 (1997-01-30) examples 1-7 claims 1,6,10	1-8,10, 12-14, 18-22, 24-27
A	GB 2 237 497 A (SUPREME PETFOODS LIMITED) 8 May 1991 (1991-05-08) the whole document	1
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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